RAYMOND J. BROWN, *Editor*
ARTHUR WAKELING, *Home Workshop Editor*
ALDEN P. ARMAGNAC, *Associate Editor*
SYDNEY OXBERRY, *Art Editor*

POPULAR SCIENCE

FOUNDED MONTHLY 1872

VOLUME 125 · NUMBER 1
15 Cents a Copy • $1.50 a Year
Published Monthly by
Popular Science Publishing Co., Inc.,
381 Fourth Ave., New York

TABLE OF CONTENTS for JULY, 1934

New Foods From the Test Tube 13
EDWIN TEALE *tells how the vigilance of nutrition experts guards our health*

Thousand-Mile Lightning Rod Protects Greatest Power Line . . 16
Resourceful engineers at Boulder Dam perform electrical marvels

Dare-Devil Tricks of Racers Make Your Driving Safer 24
Lessons learned by an automobile champion under fire, described by FRED FRAME

Barren Alkali Lands Made Fertile 28
ANDREW R. BOONE *relates how blighted farms are reclaimed by chemists*

Raccoons for Hunters Grown on State Farm 36
Thrills and problems of breeding wild game detailed by GROVER C. MUELLER

Learn the New, Correct Language of the Air 40
ARTHUR GRAHAME *writes a guide to the strange idiom flyers now speak*

Strings and Magnet Show How Meteors and Comets Travel . . . 47
Secrets of the sky's most mysterious bodies revealed by GAYLORD JOHNSON

Army Recruited from Idle Men Fights Fire and Flood 49
ROBERT E. MARTIN *tells how CCC workers find fun and adventure while saving our forests*

July, 1934, Vol. 125, No. 1. **Popular Science Monthly** is published monthly at 381 Fourth Avenue, New York, N. Y., by the Popular Science Publishing Co., Inc. A. L. Cole, President and Treasurer; R. C. Wilson, Vice President; John Nichols, Vice President; F. W. Briggs, Sec'y. Entered as second-class matter Dec. 28, 1918, at the Post Office at New York under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U. S. A. Copyright, 1934, by the Popular Science Publishing Co., Inc. Single copy, 15 cents (20 cents in Canada). Yearly subscriptions to United States and its possessions, $1.50; foreign countries, including Canada, $2. Subscribers must notify us of change of address four weeks in advance of the next publication date. Be sure to give both old and new address. The contents of this magazine must not be reprinted without permission. The editors are not responsible for unsolicited contributions, and cannot guarantee the return of such material or insure against its loss. Contributions not accompanied by sufficient postage will not be returned. In presenting numerous stories of new products of applied science, **Popular Science Monthly** does not underwrite the business methods of the individuals or concerns producing them. The use of **Popular Science Monthly** articles for stock-selling schemes is never authorized.

FEATURES AND DEPARTMENTS

A New Face for Your House . 6
Insects Under Microscope . . . 38
The Man with the Net 45
New Devices for the Household 58
Making Acids Safely at Home . 60
Hints for Radio Fans 63
Two-Tube Set Has One Tube . 64
Compact Short-Wave Set . . . 65
How's Your Driving Eye? . . 66
The Home Workshop 67
Vacation Picture Books 82
The Month's Best Auto Ideas . 84

Cover design by EDGAR F. WITTMACK

AUTOMOBILES

Auto Brakes Self-Cooled . . . 32
Deadly Gas Piped Out of Garage 42
Moving Floor Unloads Garbage 44
Illuminated Hub Cap 46
Runners Coached from Auto . 55

AVIATION

Ladders for Airship Work . . 19
Planes Air-Conditioned . . . 21
Deaf May Seek Cures in Air . . 21
Dummy Plane for Blind Flying 22
Pneumatic Tubes Speed Air Mail 30
15-Foot Plane Has 120-Mile Speed 32
Steam Turbine for Airplanes . 32
Glider Propelled by Foot Power 34
Land Catapult Launches Plane . 54

RAYMOND J. BROWN, *Editor*
ARTHUR WAKELING, *Home Workshop Editor*
ALDEN P. ARMAGNAC, *Associate Editor*
SYDNEY OXBERRY, *Art Editor*

POPULAR SCIENCE

FOUNDED MONTHLY 1872

VOLUME 125 · NUMBER 1
15 Cents a Copy • $1.50 a Year
Published Monthly by
Popular Science Publishing Co., Inc.,
381 Fourth Ave., New York

TABLE OF CONTENTS for JULY, 1934

New Foods From the Test Tube 13
EDWIN TEALE *tells how the vigilance of nutrition experts guards our health*

Thousand-Mile Lightning Rod Protects Greatest Power Line . . 16
Resourceful engineers at Boulder Dam perform electrical marvels

Dare-Devil Tricks of Racers Make Your Driving Safer 24
Lessons learned by an automobile champion under fire, described by FRED FRAME

Barren Alkali Lands Made Fertile 28
ANDREW R. BOONE *relates how blighted farms are reclaimed by chemists*

Raccoons for Hunters Grown on State Farm 36
Thrills and problems of breeding wild game detailed by GROVER C. MUELLER

Learn the New, Correct Language of the Air 40
ARTHUR GRAHAME *writes a guide to the strange idiom flyers now speak*

Strings and Magnet Show How Meteors and Comets Travel . . . 47
Secrets of the sky's most mysterious bodies revealed by GAYLORD JOHNSON

Army Recruited from Idle Men Fights Fire and Flood 49
ROBERT E. MARTIN *tells how CCC workers find fun and adventure while saving our forests*

July, 1934, Vol. 125, No. 1. **Popular Science Monthly** is published monthly at 381 Fourth Avenue, New York, N. Y., by the Popular Science Publishing Co., Inc. A. L. Cole, President and Treasurer; R. C. Wilson, Vice President; John Nichols, Vice President; F. W. Briggs, Sec'y. Entered as second-class matter Dec. 28, 1918, at the Post Office at New York under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U. S. A. Copyright, 1934, by the Popular Science Publishing Co., Inc. Single copy, 15 cents (20 cents in Canada). Yearly subscriptions to United States and its possessions, $1.50; foreign countries, including Canada, $2. Subscribers must notify us of change of address four weeks in advance of the next publication date. Be sure to give both old and new address. The contents of this magazine must not be reprinted without permission. The editors are not responsible for unsolicited contributions, and cannot guarantee the return of such material or insure against its loss. Contributions not accompanied by sufficient postage will not be returned. In presenting numerous stories of new products of applied science, **Popular Science Monthly** does not underwrite the business methods of the individuals or concerns producing them. The use of **Popular Science Monthly** articles for stock-selling schemes is never authorized.

FEATURES AND DEPARTMENTS

A New Face for Your House . 6
Insects Under Microscope . . . 38
The Man with the Net 45
New Devices for the Household 58
Making Acids Safely at Home . 60
Hints for Radio Fans 63
Two-Tube Set Has One Tube . 64
Compact Short-Wave Set . . . 65
How's Your Driving Eye? . . 66
The Home Workshop 67
Vacation Picture Books 82
The Month's Best Auto Ideas . 84

Cover design by EDGAR F. WITTMACK

AUTOMOBILES

Auto Brakes Self-Cooled . . . 32
Deadly Gas Piped Out of Garage 42
Moving Floor Unloads Garbage 44
Illuminated Hub Cap 46
Runners Coached from Auto . 55

AVIATION

Ladders for Airship Work . . 19
Planes Air-Conditioned . . . 21
Deaf May Seek Cures in Air . . 21
Dummy Plane for Blind Flying 22
Pneumatic Tubes Speed Air Mail 30
15-Foot Plane Has 120-Mile Speed 32
Steam Turbine for Airplanes . 32
Glider Propelled by Foot Power 34
Land Catapult Launches Plane . 54

POPULAR SCIENCE MONTHLY FOR JULY, 1934

Racing Electric Planes New Game 56
Plane Has Retractable Wheels . 57

MODELS

Color Animal Models in Cast . 42
Ship Mooring Taught with Model 46
Electric Steamboat Model . . . 57
Small Ship Models in Sets . . . 78
Whittled Model of Monoplane . . 81
Accessories for Model Buildings 105

NEW DEVICES FOR THE HOUSEHOLD

Disappearing Cord 58
Air Whips Cream 58
Electric Buffet 58
Safety Wringer 58
Clothes Basket on Pulley . . . 58
Air Cooler 58
Handy Assistant for Cook . . . 59
Touch Opens Door 59
Turntable for Grocer 59
Adjustable Stepladder 59
Incense Candles 59
Wire Bottle Holder 59
New Paper for Kitchen 59

NEW PROCESSES AND INVENTIONS

New Light for Microscope . . 18
Japan's Mystery Two-Man "Sub" 18
Passenger's Car Powers Ferry . 19
Clock Tells Time at Any Point . 19
Sailboat Has Spinning Sails . . 19
Stands for Picnic Dishes . . . 19
Electric Fan Freshens Boxers . 20
Giant Generator Smashes Atoms 21
House on Wheels Moved by Auto 23
Robot Prevents Jail Breaks . . 27
Diesel Train Has 125-Mile Speed 30
Rotating Jar Displays Food . . 30
Cathode Rays Guard Ships in Fog 31
Lamp Gives Unbroken Line of Light 31
Phonograph Uses Paper Records 31
Surface Cables Heat Hotbeds . 32
Amphibian Cars for Monorail . 33
Car Heats Driver's Scarf . . . 33
Flashlight Cells Run Vibrator . 34
Dropping New Match Puts It Out 34
Divining Rod Hunts Gold . . . 34
New Printing Uses Typewriter . 35
Sled Gages Explorer's Travel . 35
New Adjustable Flashlight . . 43
Home Fingerprint Outfit . . . 43
Graphite Gun for Home Use . . 44
Hat Weighs Ounce and Half . . 44
Greenhouse in Sections 45
Pump to Keep Bait Alive . . . 45
Wire Reproduces Voice . . . 46
Spring Winder for Home Shop . 46
Barrel House Completed . . . 54
Foot Paddles Speed Swimmers . 55
Air Pump Helps Build Bridge . 56
Beam Tests Shooter's Nerve . . 57

RADIO

Pen Reproduces Radio Pictures 43
Ultra-Short Waves Speed Plants 54
Broadcast from Diver's Mask . 55

PHOTOGRAPHY

Camera Gun to Trap Crooks . . 33
High Voltage Glow Photos . . 43
Infra-Red Photos of Veins . . 55
Separate Exposures from Film Roll 103

UNUSUAL FACTS AND IDEAS

Rangers Trail Fire Bugs . . . 18
Loch Ness Serpent Just a Whale 18
Gale Sets 231-Mile Record . . 20
Hats Protect Roses at Show . . 32
Invents Puzzles as Hobby . . 34
Two Men Shot from Cannon . . 35
Tail Lights for Hikers 42
"Wire" Fence Grows Wild . . 42
Masked Corps for Sewer Rescues 44
Dynamite Destroys Ant Colony . 45
Water Pipe Big as Locomotive . 45
Ingenious Dental School Tests . 53
Tags Bats to Study Habits . . 54
Mule's Jawbone as Banjo . . . 54
Paper Bags Preserve Dried Milk 55
First Aid Kit in Sign Post . . 55
Gas Guns Take Animals Alive . 56
Trap Electrocutes Rats 56
Chains Hold Gibraltar 56
9,000-Year-Old Ax 57
Cable Saves Life Guard . . . 57
Science Stunts in Your Home . 62
Colored Underwater Lights . . 71
Neon Tube Experiments . . . 75

CRAFTWORK

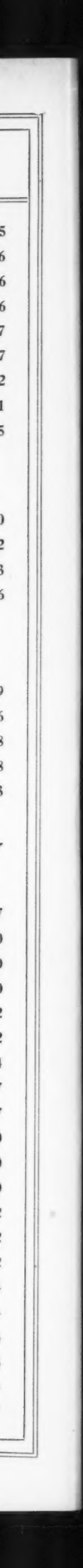
Panels Decorate Cigar Boxes . . 70
Knocker of Hand-Wrought Iron 72
Carving with Jig-Saw and Sander 73
Dog Leashes and Watch Guards 76

WOODWORKING

Picturesque Spanish Table . . . 69
Three Novelties from Lathe . . 86
Home Workshop Blueprints . . 88
Our Construction Kits 98
Few Tools Build Sewing Table . 103

IDEAS FOR THE HANDY MAN

Pepping Up Outboard Motor . . 67
Holder for Thermometer . . . 70
Boat Dock Folds Back 70
Routing Sheet Metal 70
Picture Frame Clamps 72
Screens for Steel Casements . . 72
Homeworkshop Guild News . . 74
Cushioned Back Pack 77
Relay Stops Model Railway Crashes 77
Coconut Bird Serves as Ash Tray 80
Extra Seats for Bridge Parties . 80
Suet Holder for Birds 80
Folding Pocket Ash Tray . . . 92
Small Slip-Proof Step Ladder . . 92
Filling Edge Makes File Safe . . 92
Rods to Stir Liquids 94
Shade Protects Books from Dust . 94
Canoe Seat Makes Paddling Easier 95
Using Wire Drawing Plates . . 95
Spring Raises Bicycle Stand . . 104
Coat Hooks as Footstool Feet . . 107



RAYMOND J. BROWN, *Editor*
ARTHUR WAKELING, *Home Workshop Editor*
ALDEN P. ARMAGNAC, *Associate Editor*
SYDNEY OXBERRY, *Art Editor*

POPULAR SCIENCE

FOUNDED MONTHLY 1872

VOLUME 125 · NUMBER 2
15 Cents a Copy · $1.50 a Year
Published Monthly by
Popular Science Publishing Co., Inc.,
381 Fourth Ave., New York

TABLE OF CONTENTS for AUGUST, 1934

Auto-Stealing Racket Smashed by New Methods 11
STERLING GLEASON *describes the dangerous game of wits between police and clever thieves*

Building Giant Tunnels for World's Biggest Water Pipe . . . 14
GROVER C. MUELLER *shows you how daring engineers pierce mountains to quench a city's thirst*

Weird Problems Solved by Laboratory Magicians 20
Unusual feats of chemical sleuths revealed by EDWIN TEALE

Ace Rodeo Rider Tells How He Tames Vicious Broncos . . . 24
JOHNIE SCHNEIDER *recounts the dare-devil tricks that thrill arena audiences*

Hunting Fireballs That Fall to Earth 32
How astronomers turn detectives to track down meteorites, told by FRANK CLAY CROSS

Freak Hazards Met by Telephone Trouble Men 34
ROBERT E. MARTIN *tells how birds and beasts throw lines into confusion*

Strange Things People Collect 42
Odd hobbies shared by rich and poor, described by THOMAS M. JOHNSON

Invisible Targets in Sea or Sky Hit by Navy's Miracle Guns . . 49
Behind the scenes with ANDREW R. BOONE *as the battle fleet goes into action*

Steel Balls and Magnet Show How Planets Were Born 56
GAYLORD JOHNSON *explains a simple way to demonstrate the origin of the solar system*

August, 1934, Vol. 125, No. 2. **Popular Science Monthly** is published monthly at 381 Fourth Avenue, New York, N. Y., by the Popular Science Publishing Co., Inc. A. L. Cole, President and Treasurer; R. C. Wilson, Vice President; John Nichols, Vice President; F. W. Briggs, Sec'y. Entered as second-class matter Dec. 28, 1918, at the Post Office at New York under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U. S. A.
Copyright, 1934, by the Popular Science Publishing Co., Inc.
Single copy, 15 cents (20 cents in Canada). Yearly subscriptions to United States and its possessions, $1.50; foreign countries, including Canada, $2. Subscribers must notify us of change of address four weeks in advance of the next publication date. Be sure to give both old and new address. The contents of this magazine must not be reprinted without permission. The editors are not responsible for unsolicited contributions, and cannot guarantee the return of such material or insure against its loss. Contributions not accompanied by sufficient postage will not be returned. In presenting numerous stories of new products of applied science, **Popular Science Monthly** does not underwrite the business methods of the individuals or concerns producing them. The use of **Popular Science Monthly** articles for stock-selling schemes is never authorized.

FEATURES AND DEPARTMENTS

Building Your Vacation Cabin . 6
Our Readers Say— 8
Art with a Microscope 40
The Man with the Net 45
Helpful New Household Tools . 60
Home Tests with Fire and Air . 62
Here's the Answer 64
New Ideas for Radio Workers . 65
Dual Wave Portable Set . . . 66
Are Your Headlights Safe? . . 68
The Home Workshop 69
Helpful Hints for Motorists . . 89
Making Home Movie Titles . . 90

Cover design by EDGAR F. WITTMACK

AUTOMOBILES

Strange Cars for Explorers . . . 31
Mirror Headlights on Cars . . . 44
Battery Warns When Empty . . 48
Double-Deck Auto Carrier . . . 54
Screen Collects Radiator Rust . . 54
Colored Auto Keys 55
Moving Light Signals Turn . . . 55

AVIATION

Plane Docks for New York . . 17
Half Moon Glider Flown . . . 36
Light Plane Has High Speed . . 39
Plane Has Revolving Wings . . 55

ENGINEERING

Railway of the Future 27

POPULAR SCIENCE MONTHLY FOR AUGUST, 1934

Indoor Canal Tests Barges . . . 30
New Girder Saves Time and Work 36
Bridge Rolled over Highway . . 39
Air Blast Delivers Rivets . . . 44
Divining Rod Finds Water Mains 58

MODELS

Adjustable Traffic Model . . . 18
Model Railroad in Attic 36
Historic U. S. Ships 69
Model Maker's Drill Press . . 80
Making Ship Model Fittings . . 87

NEW PROCESSES AND INVENTIONS

Three-in-One Writing Tablet . 16
Remote-Control Money Locker . 19
Music Played by Wire 28
Scissors Keep Flowers Fresh . . 29
Inflate Life Belt under Water . . 29
New Beach Bridge Table . . . 30
Machine Tests Jelly 30
New Egg Polisher 31
Midget Organ Console 31
Dog Washer Scrubs and Rinses . 38
Instant Action Fire Pump . . . 38
Machine Nut Cleans Itself . . . 44
Pneumatic Belt Aids Rescues . . 45
Pencil Contains Screwdriver . . 45
Hand-Driven Fan for Nails . . . 46
Boat Uses Beating Paddles . . . 48
Machine Helps Sick to Breathe . 48
Razor Catches Lather 54
Midget Motor for Pocket Fan . . 54
Tilted Drill Stand 54
Hanger Keeps Trousers Handy . 55
New Bookmark Is Automatic . . 58
Transparent Ruler 58
Cartoon Comics for Nursery . . 59
Asbestos Suit Protects Firemen . 59

PHOTOGRAPHY

World's Biggest Camera . . . 17
Midget Movie Outfit 28
New Camera Gives Depth . . . 59
Homemade Flash-Light Reflector 88

RADIO

Radio in Pencil 18
New Radio Range Finder . . . 18
Test Four-Inch Radio Waves . 19
Aerial Guides Submarine . . . 59

UNUSUAL FACTS AND IDEAS

New One-Man Subway Car . . 16
Study Growth of Cactus . . . 16
Fish Food That Floats 16
X-Ray to Fight Cancer 17
Workers Use Primitive Railway 18
Odd Fence for Elephants . . . 18
New Rocket Speedboat 19
Strange Contrast in Woods . . 19
New Stained Glass Rivals Best . 22
Solving Secrets of Rain 23
Odd Fingerprint Charts 28
Robot Nurses Invalids 29
Grows Cacti in Sealed Globe . . 31
Wheelbarrow Boats Devised . . 36
Test Phone Girls' Speech . . . 37
Tracking Counterfeit Money . . 37
Tests Age Leather Quickly . . 38
Wreck Roads to Test Tanks . . 38
Mice Decorate Home Novelties . 39
New Loudspeakers Heard Afar . 39
Steel Ball for Sea Explorers . . 44
Trail Murderous "Leopard Men" 45
Robot Drills Marchers 46
Stage Sounds Moved at Will . . 46
Harvest Flowers Like Wheat . . 48
Ventriloquism Tricks Explained 53
Floating Logs Resemble Glacier . 55
Boat Speeds on Hidden Fin . . . 58

CRAFTWORK

Trays with Animal Handles . . 77
Globe in Reading Lamp . . . 79
Novelties from Shells 82
Beautiful Veneered Boxes . . 94

IDEAS FOR THE HANDY MAN

A Disappearing Hose Reel . . 72
Individual Blotter Corners . . 72
Sending Voice on Light Beam . 73
National Homeworkshop Contest 74
Portable Picnic Table 76
End Table from Old Cabinet . 76
Heating Your Aquarium . . . 78
Holder for Frankfurters . . . 78
Writing on Celluloid 79
Making Fishing Waders . . . 81
Cigarette Tin Holds Drills . . 81
Old Bill Says— 82
Hook for Paint Can 82
Setting Up Shop in Garage . . 83
Measuring Split-Hundredths . . 83
A General Utility Rowboat . . 84
Home Workshop Blueprints . . 98
Transparent Plant Binders . . 101

In This Issue—Hundreds of Fascinating Articles Tell the Latest News of Laboratory Discoveries, Scientific Triumphs, and Amazing New Inventions

RAYMOND J. BROWN, *Editor*
ARTHUR WAKELING, *Home Workshop Editor*
ALDEN P. ARMAGNAC, *Associate Editor*
SYDNEY OXBERRY, *Art Editor*

POPULAR SCIENCE

FOUNDED MONTHLY 1872

VOLUME 125 · NUMBER 3
15 Cents a Copy · $1.50 a Year
Published Monthly by
Popular Science Publishing Co., Inc.,
381 Fourth Ave., New York

TABLE OF CONTENTS for SEPTEMBER, 1934

Would You Join a Mob? 11
PRESCOTT LECKY *explains how primitive emotions make killers of peaceful men*

Safer Landings for Swift Planes 22
Viewing new advances in aviation's greatest laboratory with ARTHUR GRAHAME

Raising Goldfish by the Million 24
Behind the scenes with EDWIN TEALE *in the world's strangest hatchery*

Split-Second Decisions Save Motor-Cycle Speed Demons . . . 28
LLOYD ELDER *takes you for an exciting dash behind death-defying riders*

Breeding Dogs for Brains 34
ROBERT E. MARTIN *tells how wonder animals may be produced*

Is Your Idea Worth Patenting? 40
CHESTER A. WEED *reveals ways to test the value of your inventions*

America Falls in Step to Call of Drum and Bugle 49
The lure of a fascinating diversion now sweeping country explained by EARL CHAPIN MAY

How Astronomers Measure Enormous Stars 54
GAYLORD JOHNSON *tells of the thrills of putting a yardstick on distant suns*

September, 1934, Vol. 125, No. 3. **Popular Science Monthly** is published monthly at 381 Fourth Avenue, New York, N. Y., by the Popular Science Publishing Co., Inc. A. L. Cole, President and Treasurer; R. C. Wilson, Vice President; John Nichols, Vice President; F. W. Briggs, Sec'y. Entered as second-class matter Dec. 28, 1918, at the Post Office at New York under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U. S. A.
Copyright, 1934, by the Popular Science Publishing Co., Inc.
Single copy, 15 cents (20 cents in Canada). Yearly subscriptions to United States and its possessions, $1.50; foreign countries, including Canada, $2. Subscribers must notify us of change of address four weeks in advance of the next publication date. Be sure to give both old and new address. The contents of this magazine must not be reprinted without permission. The editors are not responsible for unsolicited contributions, and cannot guarantee the return of such material or insure against its loss. Contributions not accompanied by sufficient postage will not be returned. In presenting numerous stories of new products of applied science, **Popular Science Monthly** does not underwrite the business methods of the individuals or concerns producing them. The use of **Popular Science Monthly** articles for stock-selling schemes is never authorized.

FEATURES AND DEPARTMENTS

Modernizing Your Bathroom . . 6
Our Readers Say— 8
The Man with the Net 37
Hunting Germs with Microscope . 42
Home Feats of Chemical Magic . 60
Handy Aids for Homemakers . . 62
Here's the Answer 64
Useful Hints for Radio Fans . . 65
A Suitcase Transmitter 66
Tales That Spark Plugs Tell . . 68
The Home Workshop 69
A Homemade Photo Printer . . 89
Ideas for Car Owners 92

Cover design by EDGAR F. WITTMACK

AUTOMOBILES

Hand Reflecting Signal 17
New Oil Gets Thrilling Tests . . 14
Radio Control for Tractor . . . 30
Tires of Synthetic Rubber . . . 31
Clothes Bag on Car Roof . . . 36
Car Lock Thwarts Thieves . . . 36
Spiked Carpet Halts Cars . . . 45
Compact New Brake Tester . . 47
Crashes Test New Guard Rail . . 48
Wheels on Jacks Park Car . . . 58
Vapor Finds Leaks in Tubes . . 59

AVIATION

Plane Tows Four Gliders . . . 16
Whirling Arm Tests Air Models . 32
New Tailless Pusher Plane . . 38

POPULAR SCIENCE MONTHLY FOR SEPTEMBER, 1934

Sirens Warn of Air Raid . . . 48
Pistol-Grip Air Camera 58

ENGINEERING

No Form for Concrete Piles . . 32
Rods Show Metals' "Stretch" . . 38
Horses Move 1,200-Ton Bridge . 39
Flexible Joints for Concrete . . 56
Diving Bell for Gold Hunters . . 59

MODELS

Ship Model Uses Human Hair . . 33
Model Road for Lighting Tests . 56
Largest American Flying Boat . 73
Famous Old Liner *St. Louis* . . 76
Building Model Locomotives . . 81

NEW PROCESSES AND INVENTIONS

Wrist-Watch Refrigerator . . . 16
Handle Holds Glass Panes . . . 16
Talking Beacon Guides Small Craft 17
Pocket Lock for Travelers . . . 18
Electric Stamp Marks with Heat 30
Pilotless Speedboat Trains Gunners 31
Collapsible Sawhorse 31
Compact Soldering Iron 31
Twisted Nail Pierces Concrete . . 32
Float Measures Liquid Level . . 32
Elevator Works without Cables . 37
Camera Kit for Microscope . . 38
Leg Shackle Foils Escape . . . 39
New Micro-Manipulator 39
Tubes Steer Rudderless Ship . . 45
Tester Detects Fake Coins . . . 46
Ticket Chopper Ends Graft . . . 47
New Glow Lamp Invented . . . 48
Electricity Runs Motor Cycle . . 48
Fire Sprinkler Uses Gas 48
Device Hooks Sunken Logs . . 56
Dry-Fuel Cigarette Lighter . . 56
Remote Control Cash Drawer . . 56
Coil-Spring Book Binding . . . 58
Roaster Cooks over Open Fire . 59

UNUSUAL FACTS AND IDEAS

World's Largest Drafting Board . 16
American Flag from Germs . . 18
New Lightning Studies 18
Sculpture in Street Signs . . . 19
Use Poles to Leap Ditches . . . 19
Penguins Parade on Odd Ramp . 19
New Way to Build Floors . . . 19
Marvels of Food Factories . . . 20
Six Kinds of Transportation . . 30
Children Run Merry-Go-Round . 30
Builds His Own Telescope . . . 31
Monster "Hand" of Whale . . . 32
Wage War on Barnacles . . . 33
Colored Lights Wake Seeds . . . 33
Builds Own Flivver Submarine . 33
Skeletons Pose for Artists . . . 36
"Million Dollars" in One Coin . 36
Camera Records Sign Language . 37
Tames Birds with Dummies . . 38
Doctors Use Cellophane Masks . 38
Home Hung on a Wall 46
Radio Beam Guides Racers . . . 46
Lights Tell of War on Pest . . . 46
Boat Racers Spear Balloons . . . 47
Diving Helmets Teach Swimming . 47
Black Light Reveals Murals . . 48
Novel Uses for Coat Hangers . . 53
Map Library Is Planned 56
Boy Makes Pets of Lions . . . 57
Bathers Coast down Dunes . . . 58
Pen Traces Land Contour . . . 58
Restoring Old Battle Flags . . . 59

CRAFTWORK

Cover for Cigarette Tin 78
Plating Metal on Wood 82
Bud Vases from Lead Pipe . . . 83
Novelties from Felt Hats . . . 84
Swordfish Paper Knife 105

IDEAS FOR THE HANDY MAN

Motorboat Cabins 69
Replica of Old Well 72
Proofs Pulled with Photo Roller . 72
Laying Out a Workshop . . . 74
Support for Long Rods 74
Pipe Rack Bent from Wire . . . 74
Making a Tripod Tilt-Top . . . 75
Old Bill Says— 75
Protecting Your Microscope . . 75
Kneeling Pads from Inner Tube . 78
Guild Prize Contest 79
Rapid Spinach Cleaner 80
Frames for Display Cards . . . 80
Insulating Hot Water Tank . . 80
Hose Reel Made from Junk . . 84
Holding Small Drills 84
Clips for Smoking Stand . . . 84
Three-in-One Nest of Tables . . 85
Speedy Racing Schooner 86
Our Construction Kits 88
Unicycle for Trick Riding . . . 94
Preventing Skin on Paint . . . 94
Decorative Curtain Holdbacks . 95
Home Workshop Blueprints . . 100
Tire Tape for Binding 103
Reducing Motorboat Speed . . . 104
Remote Heater Control 104

In This Issue—Hundreds of Fascinating Articles Tell the Latest News of Laboratory Discoveries, Scientific Triumphs, and Amazing New Inventions

RAYMOND J. BROWN, *Editor*
ARTHUR WAKELING, *Home Workshop Editor*
ALDEN P. ARMAGNAC, *Associate Editor*
SYDNEY OXBERRY, *Art Editor*

POPULAR SCIENCE

FOUNDED MONTHLY 1872

VOLUME 125 · NUMBER 4
15 Cents a Copy · $1.50 a Year
Published Monthly by
Popular Science Publishing Co., Inc.,
381 Fourth Ave., New York

TABLE OF CONTENTS for OCTOBER, 1934

Machines That Will Fight the Next War 13
An exciting preview with ARTHUR GRAHAME *of battles of the future*

Man-Made Lightning Solves Nature's Freaks 16
Strange pranks of thunderbolts explained by ALDEN P. ARMAGNAC

Nature Is Textbook for College on Wheels 24
HELEN CHRISTINE BENNETT *describes an adventurous experiment in education*

New Efforts May Harness Sunlight 32
ROBERT E. MARTIN *tells how scientists hope to capture the sun's energy for power*

Stamps Tell the Story of Science 34
Tales of discovery and invention found in the collector's album by CHARLES IRVING CORWIN

Things I Learned from Ten Thousand Cats 42
Expert hints from A. J. ADAMSON *on raising temperamental pets*

New Processes Developed on World's Finest Farm 49
How daring animal experts are improving the meat you eat, told by GEORGE H. DACY

Experiments Explain Rainbows and Sun's Green Flash . . . 52
GAYLORD JOHNSON *shows how you can duplicate the mysterious beauties of the skies*

October, 1934, Vol. 125, No. 4. **Popular Science Monthly** is published monthly at 381 Fourth Avenue, New York, N. Y., by the Popular Science Publishing Co., Inc. A. L. Cole, President and Treasurer; R. C. Wilson, Vice President; John Nichols, Vice President; F. W. Briggs, Sec'y. Entered as second-class matter Dec. 28, 1918, at the Post Office at New York under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U. S. A.
Copyright, 1934, by the Popular Science Publishing Co., Inc. Single copy, 15 cents (20 cents in Canada). Yearly subscriptions to United States and its possessions, $1.50; foreign countries, including Canada, $2. Subscribers must notify us of change of address four weeks in advance of the next publication date. Be sure to give both old and new address. The contents of this magazine must not be reprinted without permission. The editors are not responsible for unsolicited contributions, and cannot guarantee the return of such material or insure against its loss. Contributions not accompanied by sufficient postage will not be returned. In presenting numerous stories of new products of applied science, **Popular Science Monthly** does not underwrite the business methods of the individuals or concerns producing them. The use of **Popular Science Monthly** articles for stock-selling schemes is never authorized.

FEATURES AND DEPARTMENTS

Give Your House a New Roof . 6
Our Readers Say— 10
The Man With the Net 31
Glass Making Easy at Home . . 58
New Household Devices . . . 60
Simplest Electric Radio . . . 63
Hints for Radio Fans 64
Working Aluminum Panels . . 65
Here's the Answer 67
Avoid Used-Car Traps 68
The Home Workshop 69
Useful Kinks for Motorist . . . 76
Brilliant Big Enlargements . . . 78

Cover design by EDGAR F. WITTMACK

AUTOMOBILES

Device Says "Thank You" . . 21
Spring Clamps for License . . 28
New 700-pound Car 29
Electric-Eye Headlight Gage . . 29
Build Car in Two Weeks . . . 38
Gage Measures Map Mileage . . 40
Trailer Boosts Car Speed . . . 46
Electric Pencil Marks Tires . . 55
New Sign Flashes Help Call . . 56
Tent Garage Folds Up 74

AVIATION

Stratosphere Flight Pictures . . 23
Plane Has Eyelike Lights . . . 28
Blimp Carried on Trailer . . . 41
Study Wing Flutter in Factory . 48

POPULAR SCIENCE MONTHLY FOR OCTOBER, 1934

MODELS

Monorail Model Shown Here . 20
Builds Big Railroad Model . . . 48
Model Shows Underwater Tube . 54
America's Cup Yacht 71
Simplified Hell Diver Model . . 75
Painting Portholes on Models . 80
Water Tank for Railway . . . 86

NEW PROCESSES AND INVENTIONS

Target Ends Scoring Errors . . 19
Arm Clamp Holds Light . . . 19
Brush in Cement Tube 19
Device Rescues Swimmers . . . 20
"Blotter" Roller Dries Turf . . 20
"Fountain Pen" Paint Brush . . 28
Holder Selects Right Drill . . . 30
Self-Changing Razor Blades . . 30
Asbestos Umbrella for Firemen . 30
X-Ray Takes Fast Pictures . . 30
Light Warns Traffic of Change . 31
Locked Bulb Thwarts Thieves . 38
Compass in New Match Case . . 38
Robot Archer Tests Arrows . . 38
Fog Cleared by Chemicals . . 39
Stethoscope Finds Gas Leaks . . 41
Heats Water for Goldfish . . . 41
Bridges on Fire Hose 41
Pistol Grip Bottle Capper . . . 41
Rubber Masks Replace Make-Up . 44
New Express Stock Ticker . . 45
Propeller Runs Amphibian Craft 47
Most Accurate Wind Gage . . 47
Boat Dips to Pass Bridges . . 47
Blocks Give Runner Fast Start . 54
New Movies Have Depth . . . 55
Engine Runs on Stored Steam . 56
New Barrel Easily Opened . . 57

RADIO

Radio in Dentist's Chair . . . 46
Radio Phone Speeds Bridge . . 55
Robot Turns Radio Off and On . 55

UNUSUAL FACTS AND IDEAS

"Truth Chamber" Betrays Crooks 19
Divining Rod Finds Relics . . 19
"Meal" from Minerals 20
Feat Raises Treasure Ship . . . 21
Oxygen Speeds Up Swimmers . 21
Trailer Carries Theater 21
Air-Conditioning Deepest Mine . 22
Builds Boat in Attic 18
Knee Action on Toy Car . . . 18
Boat to View Sea Floor . . . 18
How to Make Secret Pictures . 27
Cowl Boosts Boat's Speed . . . 28
Windmill Built of Odd Parts . . 28
Build Floating Observatory . . 29
Push Buttons Order Food . . . 31
Hats Protect Fire Hydrants . . 31
Builds Nest of Barbed Wire . . 38
Artificial Drought Tests Wheat . 40
Metal Working Art Revived . . 40
New Forest to End Drought . . 45
World's Biggest Light Bulb . . 45
Test Gas Saving Devices . . . 45
Machine Tests Manual Skill . . 46
Make Parchment by Old Methods 46
One-Man Drawbridge 47
Firefly Used as Lantern . . . 48
Screw-Type Bridge Piles . . . 54
Old and New in Indian House . 55
Study Fire in Model Building . . 56
Patient Gives Self Gas 56
New Tank Lays Smoke Screen . 56
Diver Tests Water Line . . . 57
Paris Builds Mystery Towers . 57
Home Science Stunts 62

WOODWORKING

Portable Tennis Table 77
Desk for a Child 77
Simple Armchair Table 85
Home Workshop Blueprints . . 88
New Veneering Kit 108
Reeds on Furniture Legs . . . 110

IDEAS FOR THE HANDY MAN

Polarized Light Tests 69
$2,000 in Cash Prizes 72
Bushing for Loose Pulleys . . 74
Paraffin Seals Developers . . . 77
Sootproof Cover for Flue . . . 77
Laying Out an Ellipse 80
Wedging Tool Handles 80
Rolling-Pin Squeegee 80
Easily Made Veneer Press . . . 81
Toys Serve as Drawer Pulls . . 82
Patterns for Curved Surfaces . . 83
Storing Wood Composition . . 83
Acrobatic Wooden Monkeys . . 84
Hat Support in Coat Rack . . . 84
Holder for Electric Plug . . . 87
Setting Up a Bench Lathe . . . 89
Grinding a Faucet Seat 89
Wooden Costume Jewelry . . . 90
Twisted Flower Stand 91
Clips Fasten Electric Cords . . 91
Copying a Daguerreotype . . . 92
Grip for Ruling Pen 98
Saw from Razor Blade 98
Keeping Chemicals Dry 98
Comical Chick from Wood Block 99
Cement Rubs Varnish Smooth . 99
Homemade Electric Arc Furnace 100
Tire Silences Wheelbarrow . . 107
Cutting Hard Steel 111

In This Issue—Hundreds of Fascinating Articles Tell the Latest News of Laboratory Discoveries, Scientific Triumphs, and Amazing New Inventions

RAYMOND J. BROWN, *Editor*
ARTHUR WAKELING, *Home Workshop Editor*
ALDEN P. ARMAGNAC, *Associate Editor*
SYDNEY OXBERRY, *Art Editor*

POPULAR SCIENCE

FOUNDED MONTHLY 1872

VOLUME 125 · NUMBER 5
15 Cents a Copy · $1.50 a Year
Published Monthly by
Popular Science Publishing Co., Inc.,
381 Fourth Ave., New York

TABLE OF CONTENTS for NOVEMBER, 1934

Sensational Study of Heredity May Produce New Race of Men . . 15
STERLING GLEASON *tells how X-rays and black light reveal secrets of life*

Amazing New Uses Found for Glass 18
Latest marvels of America's oldest industry, described by EDWIN TEALE

Border Guard Wages War on Smugglers 26
High adventure with ANDREW R. BOONE *on the trail of fearless outlaws*

Fiends of the Desert Found to be Harmless 30
GORDON GORDON *tells how science exploded myths of deadly reptiles*

Mysterious Lost Rivers Run Mills and Power Plants 36
The harnessing of underground streams, explained by WALTER E. BURTON

Homemade Planetarium for Amateur Astronomers 46
GAYLORD JOHNSON *shows hows to reproduce the movements of stars at home*

World's Strangest Circus Produced by Amateurs 49
The remarkable feats of a group of ambitious Texans, described by A. MORTON SMITH

You Can Grow Mushrooms in Your Cellar 54
Expert advice to insure success in a fascinating and profitable business

November, 1934, Vol. 125, No. 5. **Popular Science Monthly** is published monthly at 381 Fourth Avenue, New York, N. Y., by the Popular Science Publishing Co., Inc. A. L. Cole, President and Treasurer; R. C. Wilson, Vice President; John Nichols, Vice President; F. W. Briggs, Sec'y. Entered as second-class matter Dec. 28, 1918, at the Post Office at New York under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U. S. A.
Copyright, 1934, by the Popular Science Publishing Co., Inc.
Single copy, 15 cents (20 cents in Canada). Yearly subscriptions to United States and its possessions, $1.50; foreign countries, including Canada, $2. Subscribers must notify us of change of address four weeks in advance of the next publication date. Be sure to give both old and new address. The contents of this magazine must not be reprinted without permission. The editors are not responsible for unsolicited contributions, and cannot guarantee the return of such material or insure against its loss. Contributions not accompanied by sufficient postage will not be returned. In presenting numerous stories of new products of applied science, **Popular Science Monthly** does not underwrite the business methods of the individuals or concerns producing them. The use of **Popular Science Monthly** articles for stock-selling schemes is never authorized.

FEATURES AND DEPARTMENTS

Improve Your Heating System . 6
Our Readers Say 12
The Man With the Net 33
Flowers' History in Microscope . 40
Scientific Tests at Home . . . 53
Safe Experiments with Fire . . 56
New Household Devices . . . 58
Short Wave Superheterodyne . . 60
Hints for Radio Fans 62
Here's the Answer 63
Watch Your Ammeter 64
The Home Workshop 65
Making Lifelike Portraits . . . 74
Kinks for Your Car 76

Cover design by EDGAR F. WITTMACK

AUTOMOBILES

Fan Cools Auto Tires 23
Dachshund Car Marks Road . . 23
Scout Car Has Monorail Tires . 25
Steering Wheel Folds 32
Light Gives Turn Signal . . . 34
Models Reproduce Accidents . . 35
Puts On Chains Automatically . 39
Traffic Sign Sinks When Hit . . 45

AVIATION

New Plane's Wing Folds . . . 20
Push-Button Airplane 21
"Pterodactyl" War Plane . . . 22
Twenty-Five Jumpers in Air . . 25

POPULAR SCIENCE MONTHLY FOR NOVEMBER, 1934

Talking Beacon for Planes . . . 32
Triples Air Beacon Light . . . 38
Paddle Wheels Drive Plane . . 43
Parachute for Plane 45

MODELS

Two New Ship Model Kits . . 8
A Rakish Privateer of 1812 . . 65
High-Speed Transport Plane . . 72
Battle Cruiser *Tuscaloosa* . . 73
Rubber Lessens Railway Noise . 93
Paints Kept in Test Tubes . . 94
Keel for Sailing Model 102
Automatic Crossing Gate . . . 104

NEW PROCESSES AND INVENTIONS

New Glasses Can't Break . . . 20
Comb Comes Apart 20
Repeating Slingshot 20
Device Aids Umpires 22
Organ Played by Light 22
Cast Iron for Paving 22
Gages Voltage From Light . . 23
Television Set Takes Photo . . 23
Cell Prevents Train Wrecks . . 24
New Gun Sprays Stucco . . . 24
Crayon Marks Air Mail . . . 25
Four-Wheeled Bicycle 25
Records Drive Tank 29
Pistol Hammer for Staples . . 32
Suction Cup Uses Lever . . . 32
Locomotive Has Six Engines . . 33
Electric Eye Clocks Horses . . 33
Door Key in Compact 34
Compact Sprays Face Powder . 35
Keeps Flames From Gas Tank . 38
Electricity Makes Music . . . 38
Electric-Eye Mouse Trap . . . 39
Talking Book for Blind 42
Body Motion Runs Bike . . . 44
Canned Rose Bushes 45

PHOTOGRAPHY

Plate-Sunk Photo Mounts . . . 83
Heater for Developer 83
Film Clips from Safety Pins . 83
Soft Light from Photo Bulbs . 92
Labeling Film Storage Cans . . 94
New Use for Printing Frame . 103

RADIO

Numbers Guide Radio Stars . . 22
Radio Set for Hikers 24
Echo Room Adds Realism . . . 43
Radio Kills Insect Pests . . . 48

UNUSUAL FACTS AND IDEAS

Ice from Ocean's Heat 20
Big Propellers for Super-Liner . 21
Odd Sprinkler for Window Boxes 21
Smallest Electric Furnace . . . 24
Lightning Leaves Photo 24
Fountain Pens From Feathers . 25
Revolving Hat Displays Ads . . 25
Heater Keeps Fish Warm . . . 34
Oldest "Corn" Baked Clay . . 34
Tool Making Inventor's Hobby . 34
Find Bones of Florida Giant . . 35
Wind Tunnel for Skyscrapers . 35
Hidden Lamps for Garden . . . 38
Big Speakers Report Game . . 39
Mail Shot in Rockets 39
Rapid Bean-Pole Setter 39
New War on Vermin 42
Biggest Dredge Pans Gold . . . 42
Moths Raised in Laboratory . . 42
Call System Uses Code 43
Armadillos Bred on Ranch . . 44
Odd Craft Raises Subs 44
Mirror Frame for Trick Photo . 44
Giant Sprinkler Waters Farm . 45
Tricks for Home Magician . . 53

FOR THE HOME OWNER

Making Rugs Slip-Proof . . . 78
Concealing Holes in Furniture . 81
Carrier for Raked-Up Leaves . 84
Dry-Cleaning Gloves 85
Stand Holds Cookbook Open . 93
Fixing Loose Wood Screws . . 97
Silencing an Electric Clock . . 99
Kindling Camp Fires 106
Homemade Sweeping Compound . 113
Improvised Long Envelope . . 119

IDEAS FOR THE HANDY MAN

Homeworkshop Guild News . . 68
New Auto-Driving Game . . . 69
Combination Aquarium-Bookcase 70
Jig-Sawed Dragon Bracket . . . 78
Cover for Babbitt Ladle . . . 80
Stopping an Oil Leak 80
Repairing Commutators . . . 80
Turning Wooden Dowels . . . 81
Adapter for Jig-Saw Blades . . 81
Shims from Cigarette Wrappings 82
Table Lamp Shaped Like Tree . 84
Squaring a Rip Gage 85
Toys from Coffee Cans 85
Durable Tile-Top Tables . . . 86
Home Workshop Blueprints . . 88
Inlaying Names in Wood . . . 89
Quick-Action Pin Vise 89
Tube for a Telescope 89
Laying Out a Workshop . . . 90
Old Bill Says— 91
Clock Cases from Waste Wood . 92
Glaziers' Points Hold Pictures . 92
Putty Mixed as Needed . . . 93
Holder for Soldering Flux . . 94
Thread Template Saves Time . 94
Angle Plate Fits in Cabinet . . 96
Special Reamer Stock 96
Preserving Hardware Labels . . 97
Quick Way to Tie Square Knots 97
"French Polish" for Turnings . . 99
Tap Drivers Easily Made . . . 103
Artificial Marble Vases 105
Tape Helps Apply Solder . . . 106
Jig Saw Notches Paper 106
Leather-Covered Cigarette Jar . 113
Playground Ball From Tire Tube 115
Universal Joint for Telescope . 115
Annealing Hack-Saw Blades . . 115
Lining Up Small Punches . . . 119
Homemade Cutting Oil 119

In This Issue—Hundreds of Fascinating Articles Tell the Latest News of Laboratory Discoveries, Scientific Triumphs, and Amazing New Inventions

4

DY

68
69
70
78
80
80
80
81
81
82
84
85
85
86
88
89
89
89
90
91
92
92
93
94
94
96
96
97
97
99
103
105
106
106
113
115
115
115
119
119

RAYMOND J. BROWN, *Editor*
ARTHUR WAKELING, *Home Workshop Editor*
ALDEN P. ARMAGNAC, *Associate Editor*
SYDNEY OXBERRY, *Art Editor*

POPULAR SCIENCE

FOUNDED MONTHLY 1872

VOLUME 125 · NUMBER 6
15 Cents a Copy · $1.50 a Year
Published Monthly by
Popular Science Publishing Co., Inc.,
381 Fourth Ave., New York

TABLE OF CONTENTS for DECEMBER, 1934

Fire at Sea—a Challenge to Science 15

JOHN E. LODGE *tells how inventive minds are seeking to end shipping's gravest menace*

Lone Fingerprints Trap Master Criminals 18

ANDREW R. BOONE *describes a successful new way of fighting crooks with a filing system*

Wins World-Wide Fame with Microscope Hobby 24

A visit with EDWIN TEALE *to an amateur photomicrographer's amazing laboratory*

Earth's Last Drop of Oil Sought by New Discoveries 30

What laboratory models have taught petroleum engineers, told by ROBERT E. MARTIN

Flying Battleships 36

ALDEN P. ARMAGNAC *explains why aerial cannon may revolutionize battle tactics in the skies*

How to Build a Sky Globe 42

GAYLORD JOHNSON *gives instructions for making a realistic star finder*

Stalk Sea Monsters in Odd Craft 45

How submarine observation posts may solve ocean mysteries

How Shotgun Champions Battle for Their Crowns 49

A first-hand view with WALTER E. BURTON *of a unique sporting event*

December, 1934, Vol. 125, No. 6. **Popular Science Monthly** is published monthly at 381 Fourth Avenue, New York, N. Y., by the Popular Science Publishing Co., Inc. A. L. Cole, President and Treasurer; R. C. Wilson, Vice President; John Nichols, Vice President; F. W. Briggs, Sec'y. Entered as second-class matter Dec. 28, 1918, at the Post Office at New York under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U. S. A. Copyright, 1934, by the Popular Science Publishing Co., Inc. Single copy, 15 cents (20 cents in Canada). Yearly subscriptions to United States and its possessions, $1.50; foreign countries, including Canada, $2. Subscribers must notify us of change of address four weeks in advance of the next publication date. Be sure to give both old and new address. The contents of this magazine must not be reprinted without permission. The editors are not responsible for unsolicited contributions, and cannot guarantee the return of such material or insure against its loss. Contributions not accompanied by sufficient postage will not be returned. In presenting numerous stories of new products of applied science, **Popular Science Monthly** does not underwrite the business methods of the individuals or concerns producing them. The use of **Popular Science Monthly** articles for stock-selling schemes is never authorized.

FEATURES AND DEPARTMENTS

Spare-Time Floor Repairs . . . 6
Our Readers Say 12
The Man with the Net 39
Wrap Your Gifts in Cellophane . 54
Analyzing Everyday Substances . 56
Novel Household Inventions . . 58
Hunting Echoes, New Radio Sport 60
Easily Built Amplifier 61
Low-Cost Rectifier 62
Here's the Answer 63
What to Do When Starter Balks . 64
The Home Workshop 65
How to Shade Your Photos . . 78
Ideas for Car Owners 80

Cover design by EDGAR F. WITTMACK

AUTOMOBILES

New Car-Parking System . . . 33
Neon Light Transforms Truck . 35
Self-Acting Hose Valve . . . 40
Turns Old Car into Tractor . . 44
Vacuum Holds Luggage Carrier 46

AVIATION

New Air Training Device . . . 20
Odd Insignia for Planes . . . 21
Sell Air Mileage Books 32
Odd Plane Has No Tail . . . 33
Planes Seek Hay-Fever Data . 38
Smallest Autogiro Fits Garage . 40
New Airplane Pick-Up System . 41

MODELS

Family Joins in Model Making . 28
Houses Made in Miniature . . 44

nc.,

33
35
40
44
46

20
21
32
33
38
40
41

28
44

POPULAR SCIENCE MONTHLY FOR DECEMBER, 1934

Models Show Prehistoric Life . 48
French Pursuit Plane 67
Completing Privateer's Hull . 71
Two Famous Old Steamships . 84
Ship Sails From Wire Gauze . 91
Razor Knife for Deep Cuts . . 108
Highway Flasher Signal . . . 122

NEW PROCESSES AND INVENTIONS

Compact Motorized Workshop . 20
Peephole in Surf Board . . . 21
Monorail for Bridge Transit . . 21
Sweeper Cleans Lawns 22
New Submarine Salvage Vessel . 23
Novel Chromatic Piano . . . 32
Tiny Electric Switch 32
Harvests Cotton by Suction . . 34
Improved Drill Press Vise . . 34
Golf Ball Tee Revolves . . . 34
Washable Schoolbook Binding . 38
Two Pairs of Goggles in One . 40
Lamp Encircles Tool 41
Vacuum Cleaner for City Streets 44
Typewriter Aligns Ledger Entries 44
Stainless Developing Tank . . . 46
Fuse Tells When Burnt Out . . 46
New Labels Easily Typed . . 46
Flat Pencil Used as Bookmark . 48
Toy Steam-Electric Locomotive . 48
Makes Screwdriver into Drill . 48

PHOTOGRAPHY

Snap Dove in Flight 21
Squeegee of Sponge Rubber . . 72
New $50 Photo Contest . . . 78
Polishing Ferrotype Plates . . 87
Suction Cups Hold Drying Line . 87
Negatives Filed in Tins . . . 91
Prints Drained on Glass . . . 112

RADIO

Electric Eye Guards Programs . 20
Tiny Radio for Cops 32
New Radio Facsimile Machine . 33
Radio in Baby Carriage . . . 35
New Two-Way Police Radio . . 39
Permanent Wave by Radio . . 48

UNUSUAL FACTS AND IDEAS

Chains Help Launch Liner . . 20
Strangest Rat Trap 21
Reproduce Tube for Movies . . 22
Loudspeaker Has Giant Voice . 22
Robot Plays any Tune 22
Dog Spells and Ciphers 27
Fortunes in Back Yards . . . 29
Heat Cliff to Check Slides . . 32
Camera Times Horse Races . . 33
Angler Designs Unusual Reels . 34
Machine Spins Spider Webs . . 34
Record Light from New Lamp . 35
U. S. Gets Rare Flying Snake . 38
Stage Rock-Drilling Race . . . 40
Smoke Aids Streamline Study . 41
Wreck Bends Rails in Hoop . . 46
Robots Explore Ocean Depths . 47
Magic is U. S. Official's Hobby . 47
Shoot at Cardboard Army . . . 48
Store Uses Escalators Only . . 48

FOR THE HOME OWNER

Razor Filed for Close Shave . 99
Safety Holder for Hot Poker . . 100
Mild Bleach for Spotted Floors . 102
Vinegar Cleans Boiler 103
Making Crystallized Lamps . . 104
Tape Repairs Table Oilcloth . . 106
Polish for Shoe Soles 110
Re-Enforcing Window Shades . 112

WOODWORKING

Our Construction Kits 10
A Chippendale Wing Chair . . 68
Homeworkshop Guild News . . 82
Tested Christmas Gift Plans . 90
A Roomy Magazine Rack . . 94
Walker for a Child 101

IDEAS FOR THE HANDY MAN

Simplified Tesla Coil 65
Bouquet from Tin and Wire . . 70
Cat Displays House Number . 70
Comical Ash Tray 72
Heat Shield for Pliers 72
Motor Rests on Hinge 72
Furnace Melts Aluminum . . . 73
Lighting Home for Christmas . 74
Unique Perpetual Calendar . . 76
New Trophies from Old . . . 77
Old Bill Says— 82
Spring Holder for Small Brads . 82
Hoof and Shoe Form Inkwell . 85
Mixing Soothing Hand Lotion . 85
Tacks Make Trimming Guides . 91
Laying Out a Basement Shop . 92
Unique Metal Bird Feeder . . 95
Homemade Microscope Lamp . 96
Double-Faced Electric Sign . . 99
Elbows for Hack-Saw Frame . . 100
Keeping Solder Clean 100
Tiny Oxcart Holds Cactus . . 102
Locating Toolmaker's Button . 103
Hammered Ash Tray Set . . . 104
Glazing an Aquarium 105
Novelty Cigarette Holder . . . 106
Pattern for Turnings on Lathe . 107
Webbing Helps Clamp Joints . . 107
Mailing Sack Catches Sawdust . 108
Tiny Carving Tools 109
Illuminated Christmas Star . . 110
Splining Tool Support 112
Re-Shaping Old Paint Brushes . 114
Artificial Snow from Rosin . . 115
Microscope Eye Shield 123
Drilling Holes in Glass 123

In This Issue—Hundreds of Fascinating Articles Tell the Latest News of Laboratory Discoveries, Scientific Triumphs, and Amazing New Inventions

. 94
. 101

DY

. 65
. 70
. 70
. 72
. 72
. 72
. 73
. 74
. 76
. 77
. 82
. 82
. 85
. 85
. 91
92
95
96
99
100
100
102
103
104
105
106
107
107
108
109
110
112
114
115
123
123